Prediction of spring ice phenomena on lakes and reservoirs using teleconnection indices

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ABSTRACT. The investigation is aimed to develop techniques for long-term forecasting the timing of the final disappearance of all ice on Lake Baikal, Krasnoyarsk, Irkutsk, Bratsk and Ust'-Illimsk reservoirs using teleconnection AO (Arctic Oscillation) index values. The methods suggested by author permit to anticipate a character of the ice situation with the average earliness from 21 to 48 days and the maximum one from 35 to 60 days. The probability of the permissible error value of the proposed predictive dependencies is from 88.9 to 100.0 %, their correlation index ranges from 0.89 to 0.93. The values of the prognostic information coefficient above 0.83 demonstrate the temporal stability and practical use possibility of the obtained predictive techniques. Thus, tests of potency of the developed forecasting techniques show a good quality of predictions of the dates when the South, Central and North basins of Lake Baikal, Krasnoyarsk, Irkutsk, Bratsk and Ust'-Illimsk reservoirs become totally free of ice.

Keywords: Lake Baikal, Angara-Yenisei cascade, final disappearance of all ice, ice forecasts, Arctic Oscillation index.
from 21 to 48 days and the maximum one from 35 to 60 days. The values of the probability of the permissible error of the developed predictive dependencies are from 88.9 to 100.0 %, their correlation index ranges from 0.89 to 0.93. The above indicators was calculated based on the initial datasets. Therefore, the temporal stability of the prognostic dependencies was additionally evaluated using the “ejected points” method. The estimated values of the prognostic information coefficient above 0.83 show the temporal stability and possibility of practical use of the obtained predictive techniques.

4. Conclusions

The developed predictive methods permit to forecast spring ice phenomena with the average earliness from 21 to 48 days. Tests of potency of the proposed forecasting techniques demonstrate a possibility of their practical use and good quality of predictions of the dates when the South, Central and North basins of Lake Baikal, Krasnoyarsk, Irkutsk, Bratsk and Ust'-Illimsk reservoirs become totally free of ice.

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References

